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Profiles of Extracellular Proteins Produced by *Coriolus versicolor* Under Ligninolytic and Nonligninolytic Growth Conditions

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ABSTRACT

The wood-rotting basidiomycete *Coriolus versicolor* has been grown under a variety of conditions ranging from stationary cultures on spruce wood chips or milled-wood lignin, known to be actively ligninolytic, to agitated submerged cultures, with glucose or carboxymethylcellulose as the main carbon source, that had no ligninolytic activity. Extracellular proteins have been recovered from the growth medium by ammonium sulfate precipitation and fractionated into their polypeptide components by a combination of ion exchange, affinity column chromatography, and polyacrylamide gel electrophoresis, thus providing a "fingerprint" technique for different growth conditions.

Characterization of some of the polypeptide components on the PAGE plates can be made by the use of selected staining techniques for proteins, glycoproteins, peroxidase activity, and heme-containing polypeptides. Variations in the "fingerprints" from different cultures can be demonstrated, in addition to showing the development of the extracellular protein population in an actively ligninolytic culture during the change from primary to secondary growth phases.

The effect of some of the extracellular enzymes on polymeric lignin has been demonstrated. A crude protein extract isolated from rotting wood chips was incubated with milled-wood lignin extracted from spruce sapwood. Analysis of the lignin after 48 h incubation by UV and NMR spectroscopy showed there to be an increase in aromatic hydroxyl groups with a decrease in aliphatic hydroxyl groups in comparison with sound milled-wood lignin. There was also a small reduction in the mean molecular weight of the lignin, analyzed by HPLC size-exclusion chromatography.

By contrast, lignin that had been incubated with purified laccase A showed a considerable increase in the mean molecular weight, almost doubling over a 48-h period of incubation.

REFERENCE

1. Evans, C. S., and Palmer, J. M. (1983), *J. Gen. Microbiol.* **129,** 7.